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One Health: Connecting the Dots

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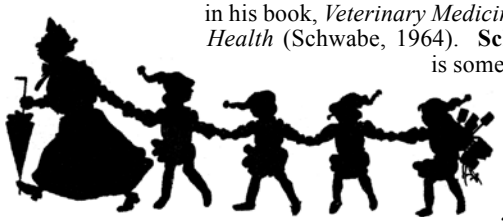
Introduction

Health sciences librarians have all been exposed to research questions and course work in public health and global health issues, but the One Health initiative opens the door to a much broader and more inclusive approach. After **MLA 2013** (the **Medical Library Association's** annual conference) in Boston, MA, I thought about the enormous task of bringing together so many different disciplines, and how libraries could do more to support the effort.

Having practiced for over 52 years at the **University at Buffalo (UB)** Health Sciences Library (HSL), I thought about the serendipity of making connections in seemingly unrelated areas, and how such intersections often benefit in unexpected ways.

So here's a trick question: what do health science libraries, animal rescue, therapy dogs, and zoos have in common? The last three, at least, involve non-human animals, yet each has its own focus, terminology and practice just as the One Health disciplines. Connecting all four areas would be a challenge at best, yet the intersection of these seemingly disparate arenas actually occurred over the last ten years or so as my many volunteer activities began to creep into my daily work life. Rescue work with cats led to requests from veterinarians for articles on cutting edge techniques; connections with the **UB** Anthropology Department from undergraduate studies and my work as a Docent at the Buffalo Zoo forged a link resulting in an adjunct faculty appointment for our Zoo director to gain access to **UB's** library resources. Zoo docent activities also put me in contact with our zoo vet who asked for literature reviews in preparation for his field research. Planning for a stress relief event for the HSL students led to bringing in therapy dogs along with food, games, and massage, sending a great public relations message to our patrons that we, as health sciences information providers, were setting a good example by caring for their health as well.



These events set the stage for me, personally, to become a strong advocate for the One Health movement.

One Health Origins

Just as the distinct areas mentioned earlier came together in interesting and productive ways, more formalized interdisciplinary collaborations are being forged in the health and social care curriculums through Interprofessional Education (IPE). Just as IPE trained providers will have more tools to solve health care problems, One Health, as envisioned by its founders back in 2008, might be thought of as the ultimate IPE, a global collaboration with the potential to truly tackle health and disease worldwide. The One Health initiative is collaboration on a universal scale, encompassing all of the health care professions serving all species, as well as environmental and ecological arenas.

> "The One Health Initiative is a movement to forge *co-equal, all-inclusive* collaborations between physicians, osteopathic physicians, veterinarians, dentists, nurses and other scientific-health and environmentally related disciplines" — *http://www.onehealthinitiative.com/*

To say that the concept of One Health has been around a long time would be an understatement. **Hippocrates**, in 400 AD, noted that health depended on the environment, and **Virchow**, in the mid-1800's said: "Between animal and human medicine there is no dividing line — nor should there be" (Brown, 2006). More recently, **Dr. Calvin Schwabe** coined the term "One Medicine" in his book, *Veterinary Medicine and Human Health* (Schwabe, 1964). **Schwabe's** term is sometimes used together with One Health. For those interested, the evolution and progress of One Health were detailed in an article published in 2014 (Gibbs, 2014).

The One Health initiative has been fully embraced by the associations that support health, scientific, and environmental disciplines, including the **American Medical Association**, **American Veterinary Medical Association**, and **American Association of Public Health Physicians**. The **Centers for Disease Control and Prevention (CDC)** and **United States Department of Agriculture (USDA)** have dedicated pages and programs, as does the **World Health Association**. However, much of the movement forward has been through identification and control of zoonotic diseases as they affect humans, with less focus on the non-human species, plants and the environment.

Human-Animal-Ecosystem Connections

Humans have been connected with other animals, and dependent on their relative ecosystems and the health of their environments, since time immemorial, but we have only begun to systematically explore those relationships.

- The human-animal bond is well documented. As early as 800 AD, the physically disabled learned to care for farm animals as part of their daily therapeutic routine. **Florence Nightingale** advocated small pets for invalids in her *Notes on Nursing* in 1860, and **Freud** (circa 1933) used one of his Chow-Chows to facilitate his therapy sessions.
- Therapy dogs and other animals measurably reduce stress through physiological means. Emotional assistance and service animals are now regularly prescribed for PTSD and other mental health conditions.
- Every drug prescribed for humans was first tested on animals, yet veterinary drug research lags far behind.
- When people refused to leave their animals behind during Hurricane Katrina, disaster planning and **Red Cross** procedures were altered for future hurricane evacuations to accommodate the animals.
- Most food borne diseases can be traced to manure contamination whether directly or environmentally (Richardson, 2016).
- About 70% of human diseases prevalent today arose from animal reservoirs (Richardson, 2016).
- Nature-deficit disorder was first identified in the book *Last Child in the Woods*, spurring a national dialogue among conservationists, developers, parents, educators and health professionals about healthy childhood development (Louv, 2008).

Other serendipitous collaborations are contributing to embracing the One Health concept. **Dr. Barbara Natterson-Horowitz**, cardiologist, reveals her epiphany as a result of treating animals at the Los Angeles Zoo (Natterson-Horowitz, 2014). Her subsequent book, entitled *Zoobiquity: The Astonishing Connection between Human and Animal Health,* inspired the founding of the **UCLA Evolutionary Medicine Interdisciplinary Center** and the annual **Zoobiquity Conference** to further the initiative (Natterson-Horowitz, 2013).

Zoos around the world are not strangers to the practice of physicians collaborating with veterinarians. Animals contract many of the same diseases and afflictions that humans suffer, and when a veterinary specialist is not available, physicians often perform the very same procedures on animals such as gorillas, sea lions, elephants, and big cats, that they do on humans. More recently, veterinary knowledge and techniques for treatment discovered decades ago is now being applied to humans, including self-injury, fear-induced heart failure, and post-partum depression. Comparative medicine, which focuses on the similarities and differences between veterinary and human medicine, is a new translational science, where veterinarians and physicians learn from each other to benefit all species.

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Moving The Agenda Forward

As noted in this ***ATG*** issue introduction, interest in One Health since the **2013 MLA Conference** in Boston has indeed continued. However, the role of librarians, educators, publishers and vendors, is still not well defined.

Catherine Pepper et al, from **Texas A&M**, published a seminal article (Pepper, 2013), on librarian roles in support of One Health. In 2016, **Vreeland** et al. evaluated the extent of open access to articles that might be used in One Health research from a sample of literature from the domains of human health, animal health and the environmental sciences (Vreeland, 2016). The **Library of Congress** Science, Technology and Business division, as part of its Webcasts for Researchers series, sponsored a webcast by **Bernadette Dunham** on the topic of One Health (Dunham, 2016).

As of June 2018, at least ten LibGuides on the topic of "One Health" were published at various universities. **Purdue**, the **University of Washington**, and **Fontbonne University** in St. Louis have dedicated One Health centers. **Berry College** in Georgia is the first to develop a One Health minor for undergraduates, and **Delaware Valley University** in partnership with their library offers a One Health seminar series. **Ohio State University** goes one step further in offering their Global One Health collection on the Canvas Network — a series of open learning courses designed to be integrated in existing curriculums. The **Virginia College of Osteopathic Medicine's** Center for One Health offered a seed funding program for six research projects in 2015.

MEDLINE added the MeSH (medical) subject heading "One Health" in 2018, just three years after this addition was suggested in a literature review of One Health and Zoonoses (Asokan, 2015). A quick search using all three subheadings produced 56 articles published just this year alone. Formerly known as "One Medicine," articles as far back as 1978 were indexed under World Health, and more recently since 2015 under Global Health.

The microbiome and antibiotic resistance are two familiar areas of particular focus, with awareness campaigns being held in many locations. The microbiome is being seen as a major factor underlying wellness and disease — for both humans and non-human animals. Just last year research revealed that plants have their own unique microbiomes, which has implications for sustainable agriculture (Posey, 2017).

Research in these focus areas and within each discipline continues. **Rock** and **Degeling** (2016) point out that thus far, One Health has been seen as simply an ecological approach to zoonotic disease in particular while the conceptual underpinnings remain ambiguous. They also note that anthropologists are uniquely well-positioned to lend depth and nuance to One Health research and practice so they become more integrated. Just as anthropologists use a "participant observer" when learning about cultures in the field, librarians can work with key individuals in different disciplines to learn the unique vocabulary, language, and terminology, and translate those insights into indexing, subject terms and retrieval strategies.

Take Action

Activities in many different areas are supporting the One Health movement. The One Health Commission promotes One Health Day annually on November 3rd with ready-made posters, logos, and planning ideas. They also have a student competition for awards up to $2,000 for events that include students from different academic disciplines working together. The **Iowa State College of Veterinary Medicine**, among others, offers One Health scholarships to students whose academic interests, course of study and research advance the One Health agenda. As noted above, publications on the topic are increasing, as well as interdisciplinary collaborations.

Data will need to be managed, as in all research, and the problems of "big data" in One Health are already being studied (Asokan et al., 2015). Libraries are also looking into their role in assisting with data management through pilot programs via **New York University** (**UB's** HSL has just finished a pilot program with **NYU**). **Pepper's** recommendation for developing new research services might be extended to data management (Pepper, 2013).

Publishers like the **Royal Society** can continue advancing the One Health agenda by inviting submissions and compiling thematic issues, like the one edited by **Cunningham**, et al., which arose from a meeting held at the **Zoological Society of London Institute for Zoology**, entitled "One Health for a changing world: Zoonoses, ecosystems and human well-being" (Cunningham, 2017).

Publishers and editors can solicit individual manuscripts with interdisciplinary topic coverage relating to the One Health initiative.

Libraries can also continue to collaborate with stakeholders to promote public awareness as they have always done. At **UB's** Health Sciences Library, an exhibit on One Health was mounted in summer 2017. In fall 2017, the **UB Genome, Environment and Microbiome (GEM) Institute** asked HSL to partner in a campaign to foster awareness about antimicrobial resistance by hosting an information table for a week. This tied in nicely with our exhibit, as one of our four-poster panels was on that topic.

LibGuides can continue to be created to meet local needs, and educational curriculums can be expanded to be more inclusive of IPE style collaborations.

Libraries and their institutions might also encourage the establishment of One Health endowments through their development office, or invite students to participate in competitions and activities on One Health Day in November.

Finally, collection development policies and subscription packages can be expanded to include more One Health related resources. Strictly veterinary libraries might add environment, ecology, public health and comparative medicine titles, while health sciences libraries might add more comparative medicine and veterinary works. For all libraries, topics like the microbiome and antibiotic resistance cut across all fields.

For the individual librarian working daily in the field, it's always hard to break down any magnificent concept into actionable items. In the case of One Health, the knowledge that this is an eternal effort, if you will, makes it somewhat easier to make that small contribution, knowing it will be part of the whole.

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Conclusion

Based on the eBook usage study done at the **University of South Alabama Biomedical Library**, and surveying literature on the topic, it can be concluded that the needs for eBooks in medical libraries have not changed, but the current pricing and packaging models present challenges to medical libraries trying to serve their users. The advantage of eBook packages is that they bring leading medical resources into one integrated package. Many eBook titles are specifically geared toward the curricular and clinical needs of health science library users. Furthermore, many of the titles in the packages are textbooks for health science students, especially for medical students and for resident training. Many medical libraries are researching emerging and alternate avenues for providing textbook access to their users, including LibGuides and open educational resources (OER). Aligning them in this way makes them more discoverable at point of need, expanding access to "free-to-you" textbooks to students. A disadvantage of the current package model is that selected (but desired) titles are only available through the packages. For instance, libraries cannot license individual eBook titles from the above mentioned packages. Bundled titles have one price and cannot be purchased separately. Package model pricing eliminates the ability for libraries to select only eBook titles needed by their library users. Committing resources to large packages limits the library's ability to purchase other materials. The librarian's ability to select more suitable titles for the collection is not available under this pricing model. eBooks are currently needed for the same reasons **Kubilius** stated in 2005: curriculum support, clinical and reference, basic science, examination review, and non-specialty books like consumer health, alternative medicine and health policy.[10] The library's need to collect eBooks to cover all these topics would be affordable if tight budgets were not already consumed by the need to pay high cost for eBook packages that contain core titles that cannot be purchased individually.

This article is based in part on research compiled for a 2017 **Medical Library Association** conference poster entitled "eBook Package Subscription Model: Benefits for Library or Publishing Industry?" The purpose of the research was to examine usage of individual titles in eBook packages commonly licensed or acquired by health sciences libraries for their users.

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Appendix: Available Health Science eBook Packages

This is a list of popular of health science eBook packages, by no means comprehensive.

McGraw-Hill Medical Collections
- AccessMedicine
- AccessAnesthesiology
- AccessCardiology
- AccessEmergency Medicine
- AccessHemOnc
- AccessNeurology
- AccessObGyn
- AccessPediatrics
- AccessPharmacy
- AccessPhysiotherapy
- AccessSurgery
- Case Files Collection
- Clinical Sports Medicine Collection
- F.A. Davis PT Collection
- McGraw-Hill Medical eBooks
- McGraw-Hill USMLE

LWW Health Library Collections from Ovid
- Anatomical Sciences
- Basic Sciences
- Integrated Basic Sciences
- Premium Basic Sciences
- Clerkship & Clinical Rotations
- Osteopathic Medicine
- Oncology
- Anesthesiology
- Surgery
- Orthopaedic Surgery
- Emergency Medicine
- Board Reviews
- Advanced Practice Nursing
- Cornerstone Pharmaceutical Sciences
- Clinical Pharmacy
- Integrated Pharmacy
- Premium Pharmacy

Elsevier
- ClinicalKey
- ClinicalKey Nursing

MedOne Collections from Thieme
- MedOne Education
- MedOne Neurosurgery
- MedOne Plastic Surgery
- MedOne Radiology
- MedOne Spine
- MedOne Otolaryngology
- MedOne Clinical Collections

AAP Collection
- AAP Neonatal Resuscitation

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